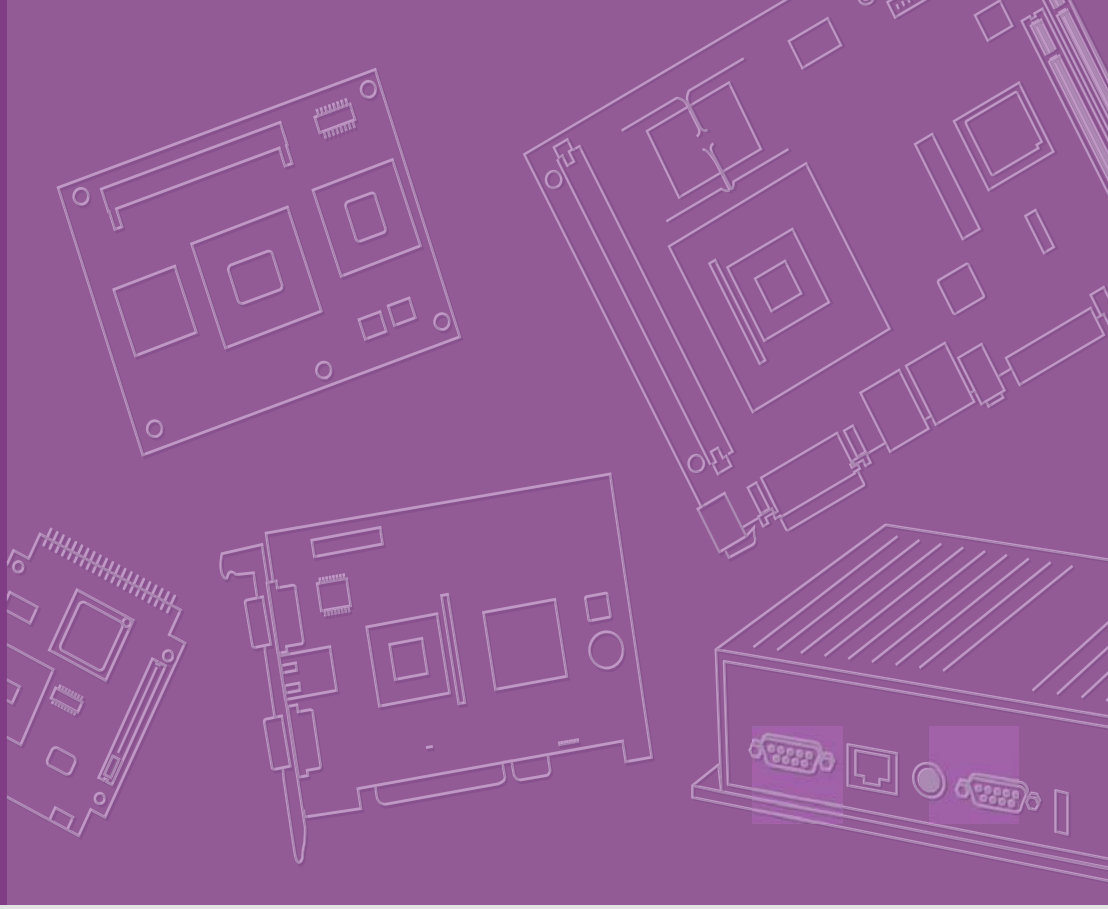

User Manual

SOM-6760

Trusted ePlatform Services

ADVANTECH

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Part No. 2006676000 Edition 1

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Product Warranty (2 years)

Warranty Period

ADVANTECH aims to meet the customer's expectations for post-sales service and support; therefore, in addition to offering 2 years global warranty for ADVANTECH's standard products, a global extended warranty service is also provided for customers upon request. ADVANTECH customers are entitled to a complete and prompt repair service beyond the standard 2 years of warranty.

Standard products manufactured by ADVANTECH are covered by a 2 year global warranty from the date of shipment. Products covered by extended warranty and cross-region repair services against defects in design, materials, and workmanship, are also covered from the date of shipment. All key parts assembled into ADVANTECH system products such as LCD, Touch Screen, Power Supply, and peripherals etc, will be also covered by the standard 2 year warranty.

Repairs under Warranty

It is possible to obtain a replacement (Cross-Shipment) during the first 30 days of purchase (45 days for Channel Partners), if the products were purchased directly from ADVANTECH and the product is DOA (Dead-on-Arrival).

DOA Cross-Shipment excludes any customized and/or build-to-order products. The Cross-Shipment agreement signed by customers is required for initiating/releasing cross shipment with ADVANTECH confirmation and verification. The only conditions for Cross-Shipment are: a) the return must not be damaged, altered or marked, b) all parts and accessories must be included as originally shipped; and c) proof of purchase must be included. Any returns that do not meet mentioned requirements above, or any wrong user settings/configurations will be denied, or subject to additional handling/service charges as determined by the ADVANTECH Repair Service Department.

For those products which are not DOA, the return fee to an authorized ADVANTECH repair facility will be at the customers' expense. The shipping fee for reconstructive products from ADVANTECH back to customers' sites will be at ADVANTECH°Øs expense.

Exclusions from Warranty

- The product is excluded from warranty if:
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- Warranty has been voided by removal or alternation of product or part identification labels.
- The product has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible whether by accident or other cause. Such conditions will be determined by ADVANTECH at its sole unfettered discretion.
- The product is damaged beyond repair due to a natural disaster such as a lighting strike, flood, earthquake, etc.
- Product updates/upgrades and tests upon the request of customers who are without warranty.

Declaration of Conformity

FCC

This device complies with the requirements in part 15 of the FCC rules: Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

Caution! *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer?Os instructions.*

Packing List

Before installation, please ensure the following items have been shipped:

- 1 SOM-6760 CPU module
- 1 Utility CD (Including manual and driver)
- 1 heatspreader 95*95*11 mm

Ordering information

Model Number Description

Part No.	SOM-6760FL-S1A1E	SOM-6760FL-S6A1E
CPU	ATOM Z510 1.1 GHz	ATOM Z530 1.6 GHz
L2 Cache	512K L2	512K L2
Chipset	Intel® SCH US15W	Intel® SCH US15W
LVDS	24-bit	24-bit
VGA	V	V
SDVO	See Note1	See Note1
10/100 LAN	1	1
HD Audio	V	V
PCIe x 1	1	1
PCI	3	3
USB 2.0	8	8
LPC	1	1
SMBUS	1	1
ATX Power	V	V
AT Power	V	V
Thermal Solution	Passive	Passive
Operation Temp.	0 ~ 60°C	0 ~ 60°C

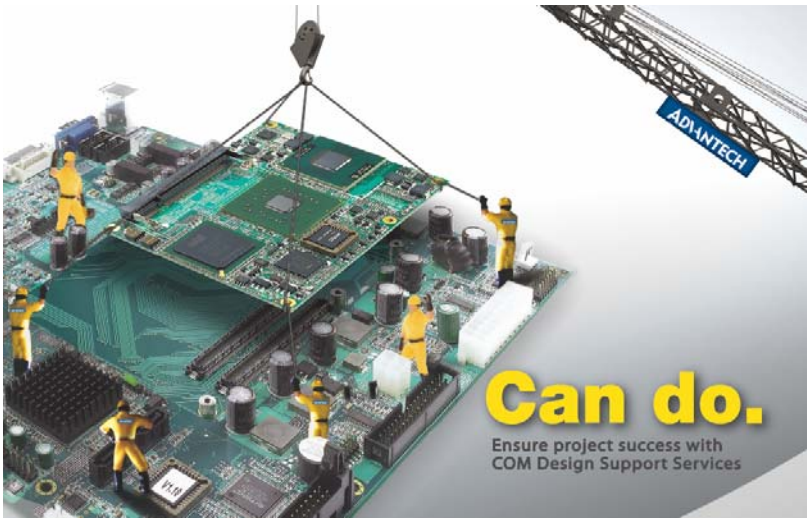
Development Board

Part no.	Description
SOM-DB5700-00A2E	Development Board for COM-Express

For more information please refer to “Advantech Baseboard Check List” and “Evaluation Board Reference Schematic”.

You could download “Advantech Baseboard Check List” and “Evaluation Board Reference Schematic” from http://com.advantech.com/

COM Design Support Services



A Series of Value-Added Services for Carrier Board Development

Advantech COM Design Support Services help customers to reduce the time and work involved with designing new carrier boards. We handle the complexities of technical research and greatly minimize the development risk associated with carrier boards.

COM Product & Support Services

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- Comprehensive Document Support

Thermal Solution Services

- Standard Thermal Solutions
- Customized Thermal Solutions

Design Assistance Services

- Schematic Review
- Placement and Layout Review
- Debugging Assistance Services
- General/Special Reference Design Database

Embedded Software Services

- Embedded OS
- BIOS Customization
- Application Library: SUSI (Secure and Unified Smart Interface)

COM Design Support Zone: http://com.advantech.com/

Advantech reserves the right to determine, on a case by case basis, whether or not COM Design Support Services are appropriate.

A Series of Value-Added Services for Carrier Board Development

Advantech COM Design Support Services help customers to reduce the time and work involved with designing new carrier boards. We handle the complexities of technical research and greatly minimize the development risk associated with carrier boards.

	COM Product & Support Services Advantech provides a full range of Computer on Modules including COM-Express, ETX, XTX and COM-Micro to fulfill diverse customer applications. Advantech also serves comprehensive document support to clients for project development.
	Design Assistance Services The Design Assistance Service is created to offer essential help to complete crucial development tasks: schematic review, placement review, debugging and a general/special database of technologies for reference purposes. All services reduce design risks associated with completing customer carrier boards.
	Thermal Solution Services In order to provide quicker and more flexible solutions for customer's thermal designs. Advantech provides thermal solution services including modularized thermal solutions and customized thermal solutions.
	Embedded Software Services Advantech provides Embedded Software Services to customers who integrate Advantech hardware products. Advantech Embedded Software Services include Embedded BIOS services, OS services and API Library (SUSI), Embedded Software Services help decrease design effort and project complexity, and accelerate product development.

COM Design Support Zone: http://com.advantech.com/

Advantech reserves the right to determine, on a case by case basis, whether or not COM Design Support Services are appropriate.

Technical Support and Assistance

For more information about this and other Advantech products, please visit our website at:

http://www.advantech.com/

http://www.advantech.com/ePlatform/

For technical support and service, please visit our support website at:

http://support.advantech.com.tw/support/

Additional Information and Assistance

1. Visit the Advantech web site at http://www.advantech.com/ where you can find the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Chapter 1

General Introduction

This chapter gives background information on the SOM-6760.

Sections include:

- **Introduction**
- **Specifications**

1.1 Introduction

SOM-6760 is an embedded COM-Micro Type 2 CPU module. The new CPU module supports Intel Z510 (1.1 G) or Z530 (1.6 G) processor by Intel System Controller Hub US15W chipset which supports H.264, MPEG2 and MPEG4 H/W decode, integrated graphic engine: Intel Graphics Media Accelerator 500, DirectX 9Ex. In a basic form factor of 95 mm x 95 mm, the SOM-6760 provides a scalable high performance with lower power consumption and easy to integrate solution for customers' applications by utilizing a plug-in CPU module on an application-specific customer solution board.

The SOM-6760 with advanced I/O capacity incorporates serial differential signaling technologies such as PCI Express x 1, PCI Masters x 3, USB 2.0, 24bit LVDS, VGA, HD audio and 10/100 LAN. SOM-6760 offers design partners more choices for their own applications need lower power consumption while maintaining a compact form factor.

SOM-6760 complies with the "Green Function" standard and supports Idle, Standby and Suspend modes. The small size (95 mm x 95 mm) and use of two high capacity connectors based on the proven COM-Micro form factor, allow the COM-Micro modules to be easily and securely mounted onto a customized solution board or our standard SOM-DB5700 development board.

The SOM-6760 is a highly integrated multimedia COM that combines audio, video, and network functions. It provides good calculated ability but with lower power consumption, single channel LVDS interface for small/ middle size TFT LCD display, DDR2 memory up to 2 GB, high definition audio interface (AC97/Azalia), 25 to 112 MHz. Major on-board devices adopt PCI technology, to achieve computing performance when customer adopts SOM-6760 to establish their own application.

1.2 Product Specifications

Table 1.1: Product Specifications

Form Factor		**COM-Micro, Module Pin-out Type II**
Processor System	CPU	Intel® Atom processor Z510 1.1 GHz, Z530 1.6 GHz
	Front Side Bus	400/533 MHz
	System Chipset	Intel® System Controller Hub US15W
	BIOS	AWARD™ 4 Mbit Flash BIOS
Memory	Technology	DDR2 400/533 MHz
	Max. Capacity	up to 2 GB
	Socket	1 x 200-pin SODIMM socket
Display	Chipset	Intel® SCH US15W
	VRAM	Share system memory up to 256MB
	Graphic Engine	Intel® Graphics Media Accelerator 500 DirectX 9Ex Support H.264, MPEG2 and MPEG4 hardware decode
	LVDS	24-bit single channel LVDS
	VGA	Up to 1600 x 1200 @ 24-bit
	DVI	N/A
	TV Out	N/A
	SDVO	N/A, SDVO Port is alternative by VGA function
	Dual Display	CRT + LVDS

Table 1.1: Product Specifications		
Ethernet	Chipset	Intel 82551QM 10/100 Mbps Ethernet
	Speed	10/100Mbps IEEE 802.3u 100Base-T Fast Ethernet
WatchDog Timer		256 levels timer interval, from 0 to 255 sec. or min, setup by software, jumperless selection, generates system reset
Expansion		LPC, 1 PCIe x 1, 3 PCI master, 4-bits SDIO1.1
I/O	PATA	1 x EIDE (UDMA 100)
	SATA	N/A
	USB	8 x USB 2.0
	Audio	High definition audio interface
	GPIO	8-bit GPIO
Power	Power Type	ATX, AT
	Power Supply Voltage	+12 V, + V5_SB
	Power Consumption (Typical)	Typical: (1 GB DDR2 667) +12 V @ 0.477 A 5 VSB @ 0.455 A (Intel Z510 1.1 G) +12 V @ 0.477 A 5 VSB @ 0.453 A (Intel Z530 1.6 G)
	Power Consumption (Max, test in HCT)	Max: (1 GB DDR2 667) +12 V @ 0.769 A 5 VSB @ 0.456 A (Intel Z510 1.1 G) +12 V @ 0.898 A 5 VSB @ 0.456 A (Intel Z530 1.6 G)
Environment	Operating Temperature	0 ~ 60° C (32 ~ 140° F)
	Operation Humidity	0% ~ 90% relative humidity, non-condensing
Mechanical	Dimension	95 x 95 mm (3.74" x 3.74")

1.3 Mechanical Specification

1.3.1 Dimension(mm)

COM-Micro form factor, 95 mm (L) * 95 mm (W) (3.74" x 3.74")

1.3.2 Height on Top(mm)

Under 8 mm base on SPEC definition (without Heatsink)

1.3.3 Height on Bottom(mm)

Under 3.8 mm base on SPEC definition

1.3.4 Heatsink Dimension(mm)

L95 mm * W95 mm * H11 mm (Heatsink)

1.3.5 Weight(g) with Heatsink

350 g (weight of total package)

1.4 Electrical Specification

1.4.1 Power Supply Voltage

Voltage requirement:

+12 V, +V5_SB

1.4.2 Power Supply Current

Table 1.2: SOM-6760 Power Consumption (1.1G CPU)

		POWER Schemes	CPU Board Total consumption	
			Full loading	Idle Mode
Input / Ouput	Voltage(V)	Portable/ Laptop	Watt(W)	Watt(W)
Input	12		8.472	4.968
Input	5VSB	Portable/ Laptop	1.23	1.225
Total			9.702	6.193

Table 1.3: SOM-6760 Power Consumption (1.6G CPU)

		POWER Schemes	CPU Board Total consumption	
			Full loading	Idle Mode
Input / Ouput	Voltage(V)	Portable/ Laptop	Watt(W)	Watt(W)
Input	12		10.02	4.968
Input	5VSB	Portable/ Laptop	1.23	1.215
Total			11.25	6.183

1.5 Environmental Specification

1.5.1 Operating Temperature

Operating temperature: 0 ~ 60° C (32 ~ 140° F)

The operating temperature means the environment temperature for the model. Please make sure the heat spreader temperature for SOM-6760 should under below 60° C.

1.5.2 Operating Humidity

0% ~ 90% Relative Humidity, non-condensing

1.5.3 Storage Temperature

Standard products (0 ~ 60° C)

Storage temperature: -40 ~ 85° C

1.5.4 Storage Relative Humidity

Standard products (0 ~ 60° C)

Relative humidity: 95% @ 60° C

Chapter 2

H/W Installation

This chapter gives mechanical and connector information on the SOM-6760 CPU Computer on Module.

Sections include:

- Connector Information
- Mechanical Drawing

2.1 Jumpers

2.1.1 Jumper List

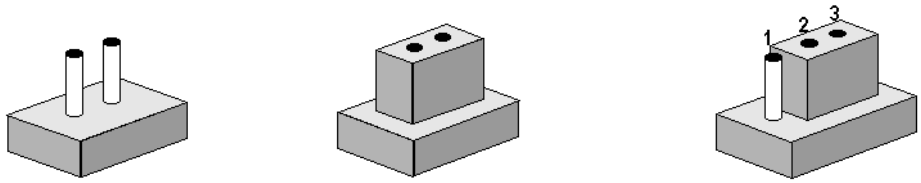
J3	PCI VIO Selection

2.1.2 Jumper Settings

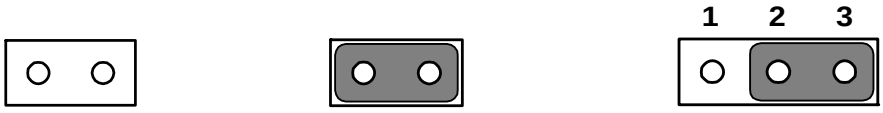
J3: PCI VIO Selection	
PIN HEADER 3*1P 2.0mm	
Setting	**Function**
1-2	+3.3 V (Default)
2-3	+5.0 V

2.1.3 Jumper Description

Cards can be configured by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, you connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



The jumper settings are schematically depicted in this manual as follows.



A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

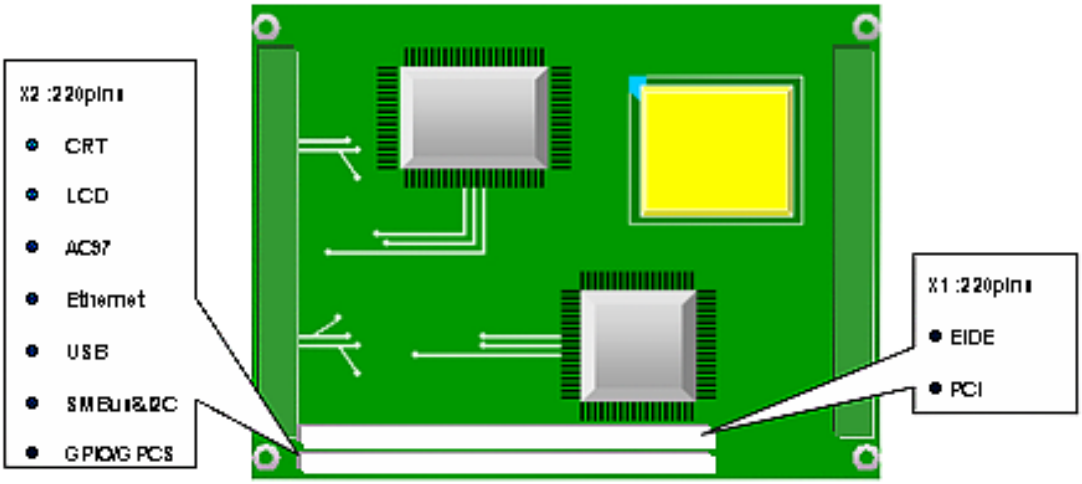
Setting	Function
1-2	+5 V
2-3	+3.3 V

Warning! *To avoid damaging the computer, always turn off the power supply before setting jumpers. Clear CMOS. Before turning on the power supply, set the jumper back to 3.0 V Battery On.*

2.2 Connectors

2.2.1 Board Connector

There are two connectors at the rear side of SOM-6760 for connecting to carrier board.



Pin Assignments for X1/2 connectors
Please refer to Advantech_COM_Express_Design Guide, Chapter 2.
You could download Advantech_COM_Express_Design Guide from:
http://com.advantech.com/

2.2.2 Connector List

CN1	SD Card Connector
CN3	FAN Connector

2.3 Mechanical

2.3.1 Jumper and Connector Location

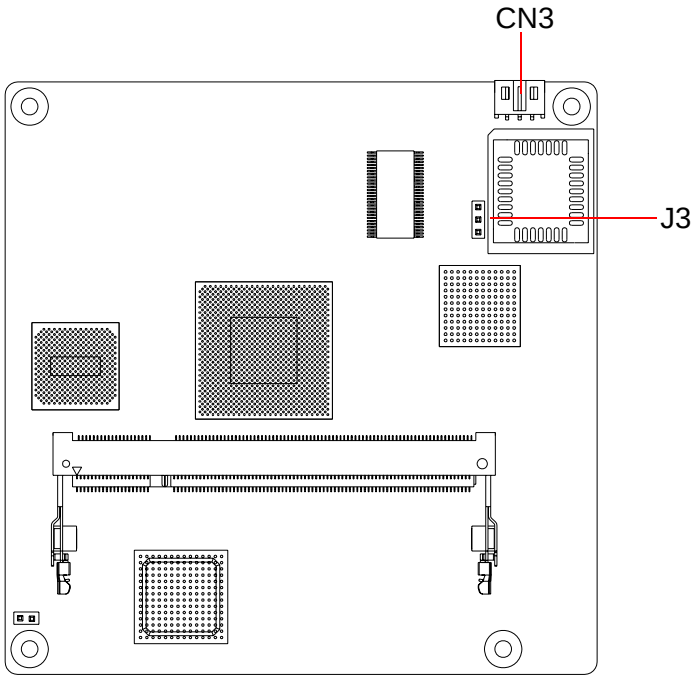


Figure 2.1 Jumper and Connector Layout (Component Side)

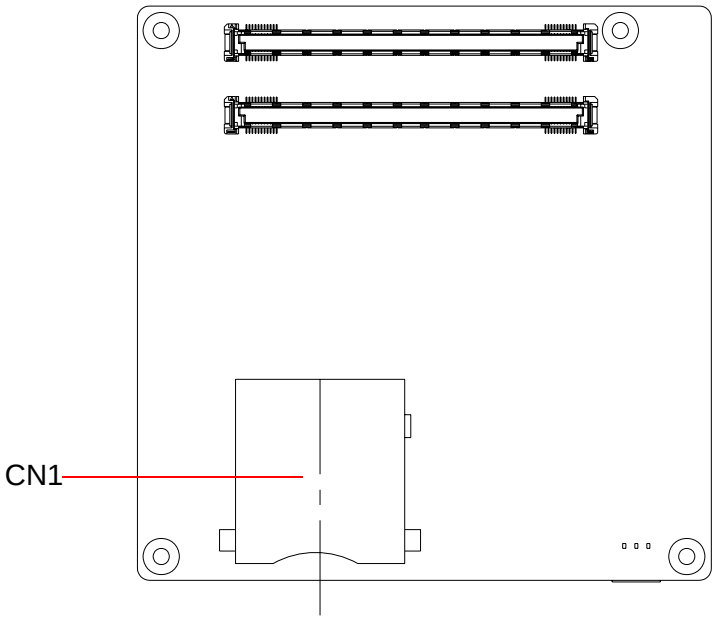


Figure 2.2 Jumper and Connector Layout (Solder Side)

2.3.2 Board Dimension

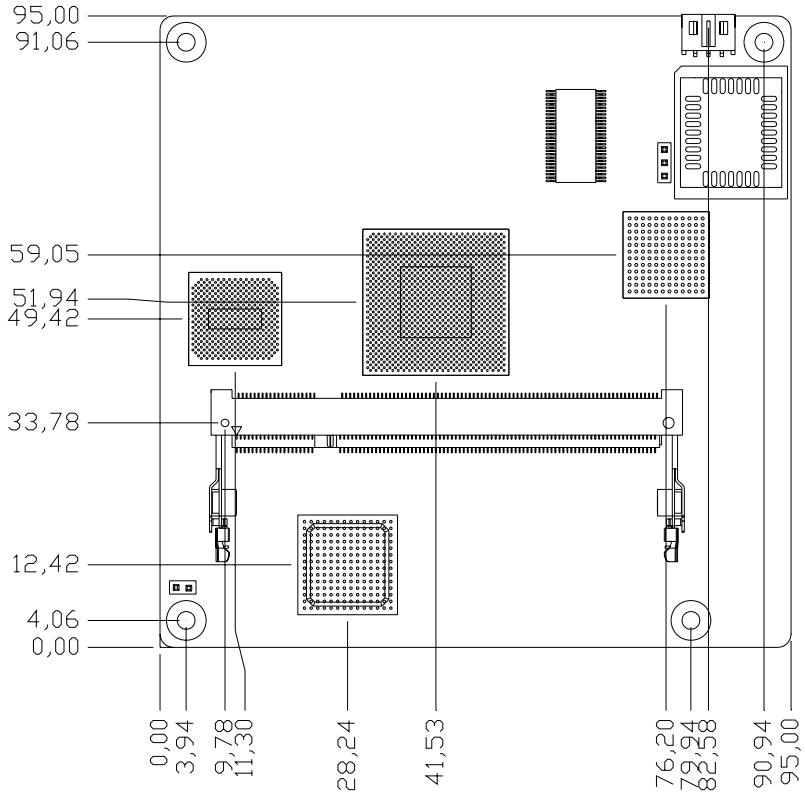


Figure 2.3 Board Dimension Layout (Component Side)

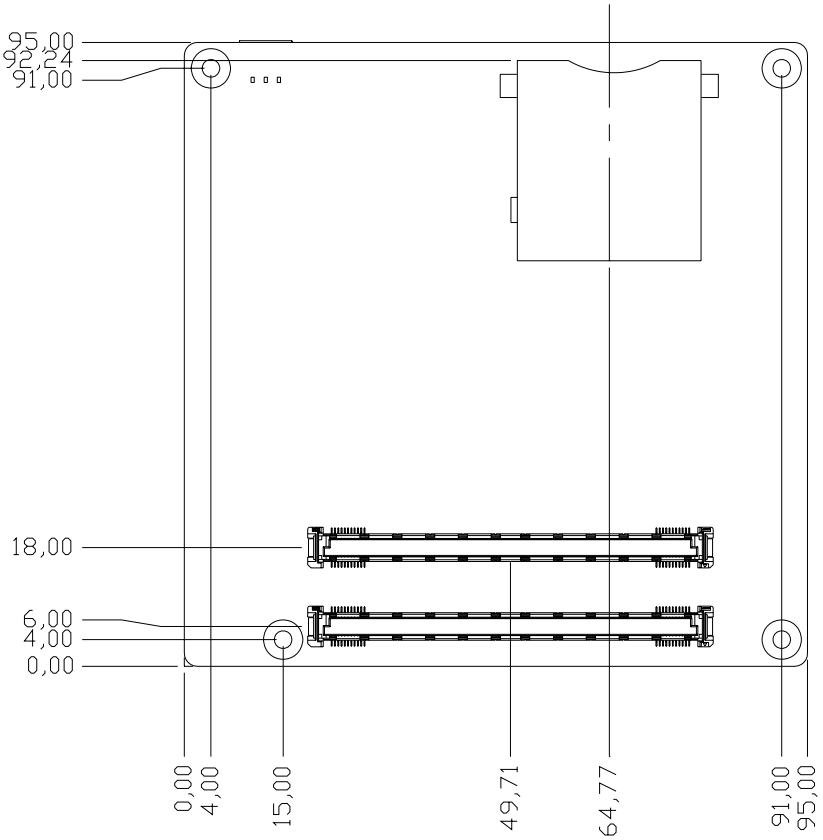


Figure 2.4 Board Dimension Layout (Solder Side)

2.3.3 Heat spreader Dimension

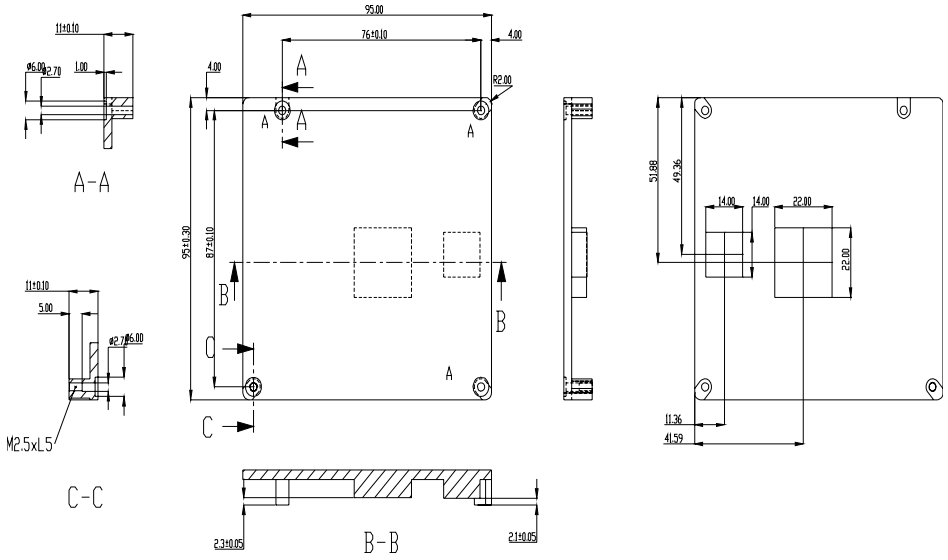


Figure 2.5 Drawing of Heatspreader for BGA type CPU

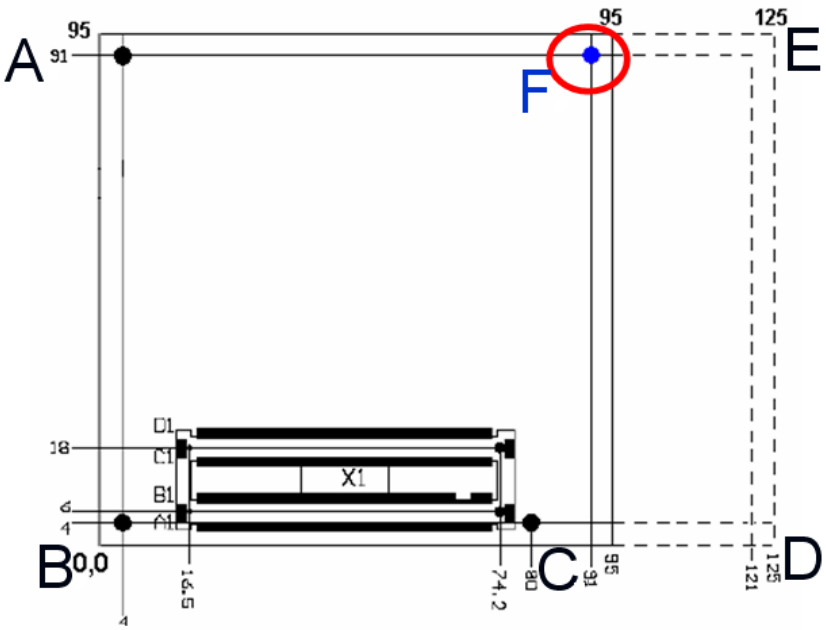
2.3.4 Thermal Solution

Important notice:

1. Please kindly be noticed, the heat-spreader shipped with Advantech SOM product is not a “COMPLETE” thermal solution. The function of this heat-spreader is for conducting heat from SOM module to customer°Øs heat-sink or cooler which is added on this heat-spreader.
2. An extra efficient heat-sink or cooler is required to add on this heat-spreader for ensuring the SOM module can work appropriately.
3. An inefficient heat-sink or cooler may damage the SOM module. This kind of damage will invalidate the product warranty.
4. Advantech is able to provide optional heat-sink or cooler for SOM module, please contact your sales representative for details.
5. Please make sure the heat spreader temperature for CPU module should under 60° C.

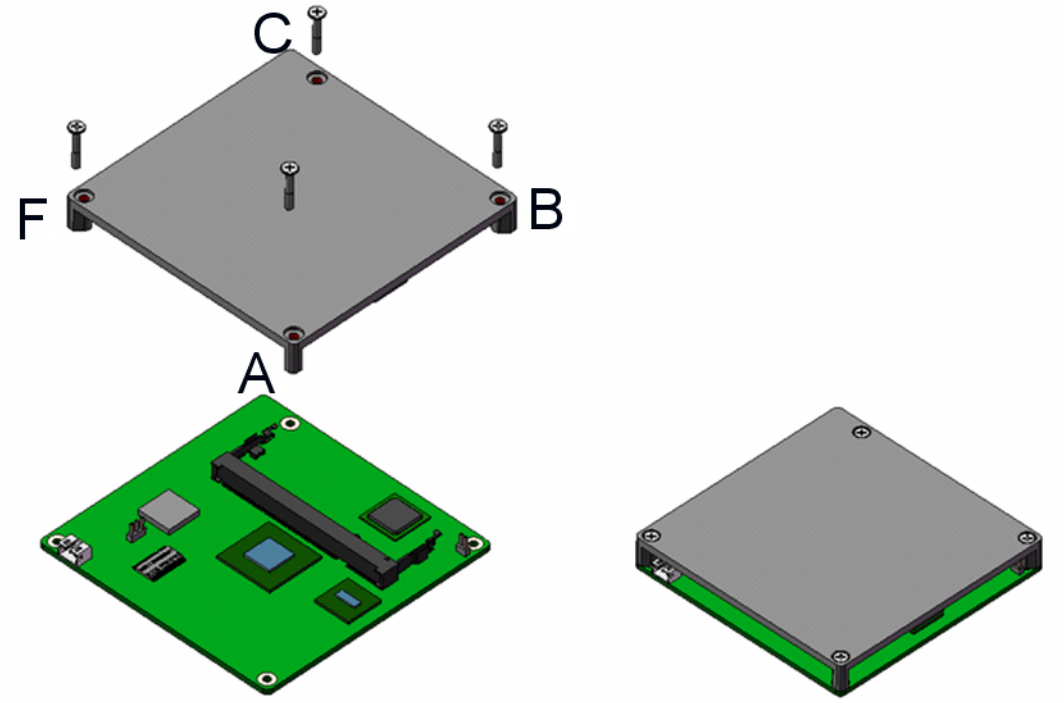
2.3.4.1 COM-Micro(95x95mm) Mounting hole

- There is additional mounting hole “F” compared with COM-Express (125 x 95mm)form factor.
- There is suitable heat spreader and screw for carrier board with or without “F” mounting hole.



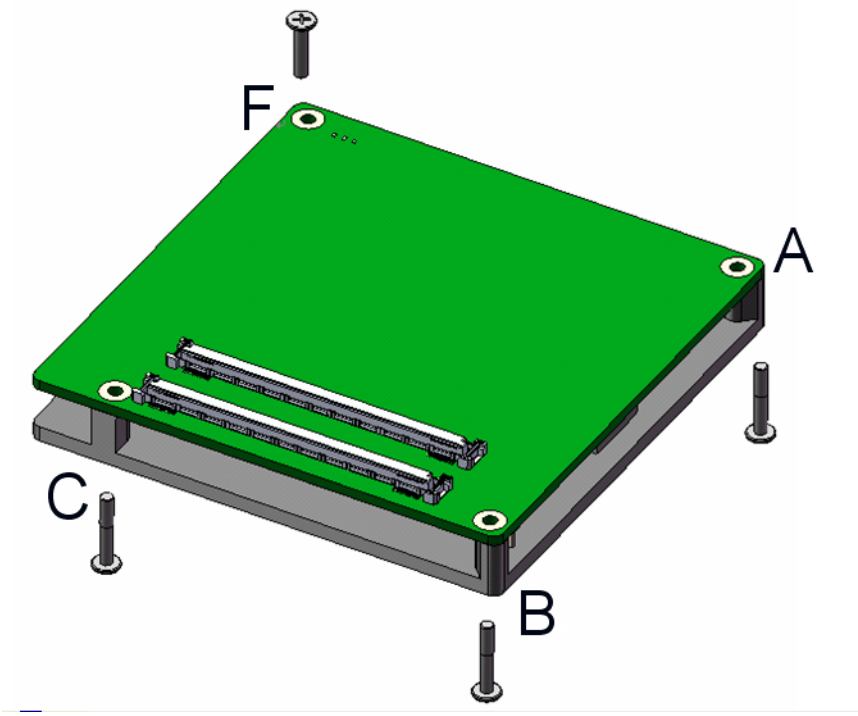
2.3.4.2 If the carrier board design following COM-Micro (with F mounting hole)

- 4 mounting holes on carrier board (A, B, C & F)
- 4 screws(16mm) on A, B, C & F
  - Screw top down from heat spreader through COM module to baseboard



2.3.4.3 Carrier board design following COM-Express (W/O F mounting hole)

- 5 mounting holes on carrier board (A, B, C, D & F)
- 3 screws(16mm) on A, B, C
  - Screw top down from heat spreader through COM module to carrier board
- 1 screws(6mm) on F
  - Screw bottom up from COM module to heat-spreader



Module should be equipped with a heat-spreader. This heat-spreader by itself does not constitute the complete thermal solution for a module but provides a common interface between modules and implementation-specific thermal solutions.

The overall module height from the bottom surface of the module board to the heat-spreader top surface shall be 13mm for COM-Micro modules. The module PCB and heat-spreader may be used which allows use of readily available standoffs.

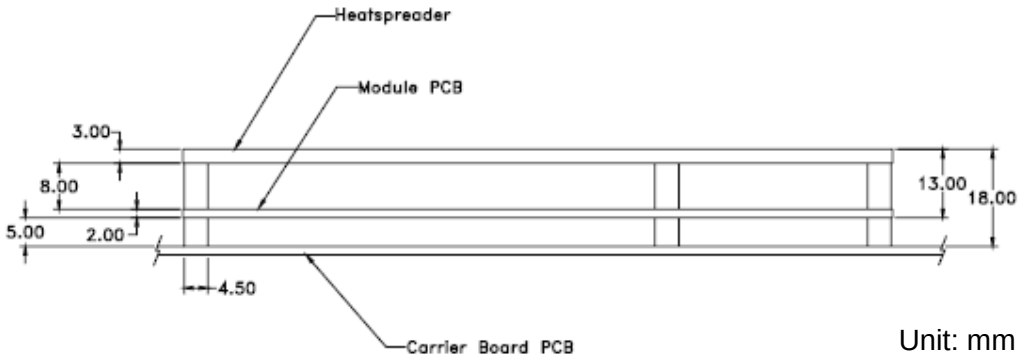


Figure 2.6 Overall Height for Heat-Spreader in COM-Micro Modules

Tolerances (unless otherwise specified):

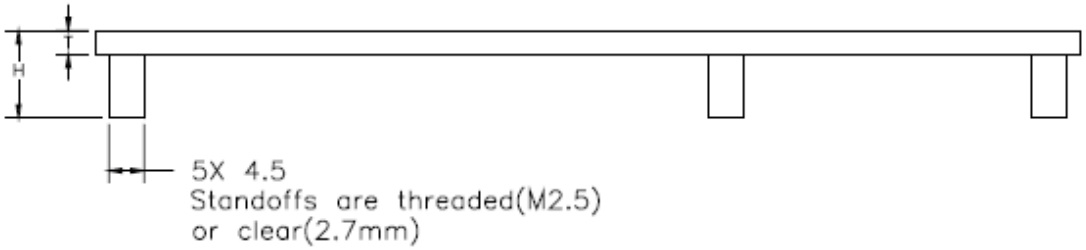
Z (height) dimensions should be ±0.8mm [±0.031”] from top of Carrier Board to top of heat-spreader.

Heat-spreader surface should be flat within 0.2mm [.008”] after assembly.

Interface surface finish should have a maximum roughness average (Ra) of 1.6µ [63µ in].

The critical dimension in Figure 8-3 is the module PCB bottom side to heat-spreader top side. This dimension shall be 13.00 mm ± 0.65 mm [±0.026”].

Figure 8-3 shows a cross section of a module and heat-spreader assembled to a Carrier Board using the 5mm stack height option. If 8mm Carrier Board connectors are used, the overall assembly height increases from 18.00mm to 21.00 mm.



Thickness 'T' is implementation specific and may be 3mm.

Height 'H' plus (or including) module PCB thickness shall be 13.00mm

For more information please refer to Advantech_COM_Express_Design Guide, Chapter 8.

You could download Advantech_COM_Express_Design Guide from:

http://com.advantech.com/

Chapter 3

BIOS Operation

Sections include:

- **BIOS Introduction**
- **BIOS Setup**

3.1 BIOS Introduction

AwardBIOS 6.0 is a full-featured BIOS provided by Advantech to deliver superior performance, compatibility, and functionality to industrial PCs and embedded boards. Its many options and extensions let you customize your products to a wide range of designs and target markets.

The modular, adaptable AwardBIOS 6.0 supports the broadest range of third-party peripherals and all popular chipsets, plus Intel, AMD, nVidia, VIA, and compatible CPUs from 386 through Pentium, AMD Geode, K7 and K8 (including multiple processor platforms), and VIA Eden C3 and C7 CPUs.

You can use Advantech's utilities to select and install features that suit your needs and your customers' needs.

3.2 BIOS Setup

SOM-6760 system has AwardBIOS 6.0 built-in, which includes a CMOS SETUP utility that allows users to configure settings as required or to activate certain system features.

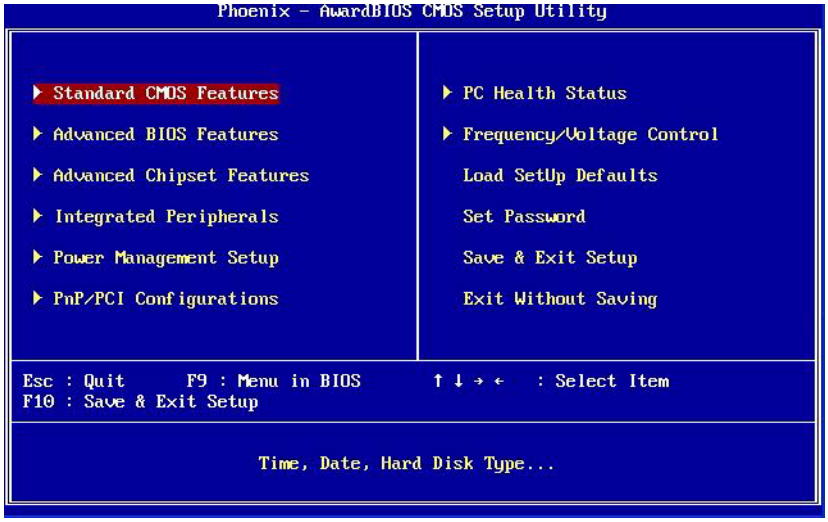
The CMOS SETUP saves configuration settings in the CMOS RAM of the motherboard. When the system power is turned off, the onboard battery supplies the necessary power to the CMOS RAM so that settings are retained.

To access the CMOS SETUP screen, press the <Del> button during the power-on BIOS POST (Power-On Self Test).

CMOS SETUP Navigation and Control Keys	
< ↑ >< ↓ >< ← >< → >	Move to highlight item
<Enter>	Select Item
<Esc>	Main Menu - Start Quit sequence
	Sub Menu - Exit the current page and return to level above
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Item Help
<F5>	Load Previous Values
<F7>	Load SetUp Defaults
<F10>	Save all CMOS changes

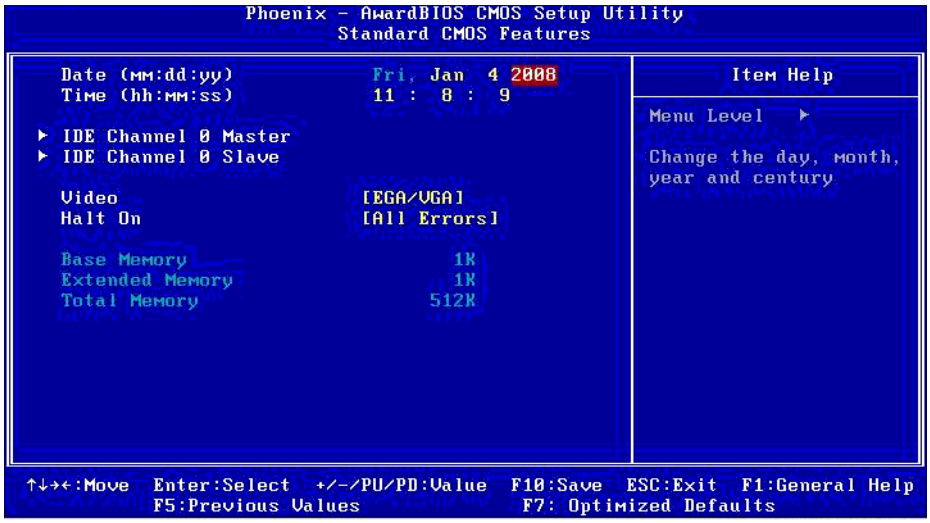
3.2.1 Main Menu

Press the <Del> key during startup to enter the BIOS CMOS Setup Utility; the Main Menu will appear on the screen. Use arrow keys to highlight the desired item, and press <Enter> to accept, or enter the sub-menu.



- **Standard CMOS Features**
  This setup page includes all the features for standard CMOS configuration.
- **Advanced BIOS Features**
  This setup page includes all the features for advanced BIOS configuration.
- **Advanced Chipset Features**
  This setup page includes all the features for advanced chipset configuration.
- **Integrated Peripherals**
  This setup page includes all onboard peripheral devices.
- **Power Management Setup**
  This setup page includes all the power management items.
- **PnP/PCI Configurations**
  This setup page includes PnP OS and PCI device configuration.
- **PC Health Status**
  This setup page includes the system auto-detect CPU, system temperature and voltage.
- **Frequency/Voltage Control**
  This setup page includes CPU clock ratio configuration.
- **Load SetUp Defaults**
  This selection loads setup values for best system performance configuration.
- **Set Password**
  Establish, change or disable passwords.
- **Save & Exit Setup**
  Save CMOS value settings to CMOS and exit BIOS setup.
- **Exit Without Saving**
  Abandon all CMOS value changes and exit BIOS setup.

3.2.2 Standard CMOS Features



- **Date**

  The date format is <weekday>, <month>, <day>, <year>.

Weekday	From Sun to Sat, determined and displayed by BIOS only
Month	From Jan to Dec.
Day	From 1 to 31
Year	From 1999 through 2098

- **Time**

  The time format is <hours> : <minutes> : <seconds>, based on 24-hour time.

- **IDE Channel 0 Master/Slave**

  IDE HDD Auto-Detection - Press "Enter" for automatic device detection.

- **Halt on**

  This item determines whether the computer will stop if an error is detected during power up.

No Errors	The system boot process will not stop for any error
All Errors	Whenever the BIOS detects a non-fatal error the system boot process will be stopped.
All, But Keyboard	The system boot process will not stop for a keyboard error, but will stop for all other errors. (Default value)

- **Base Memory**

  Displays the amount of base (or conventional) memory installed in the system.

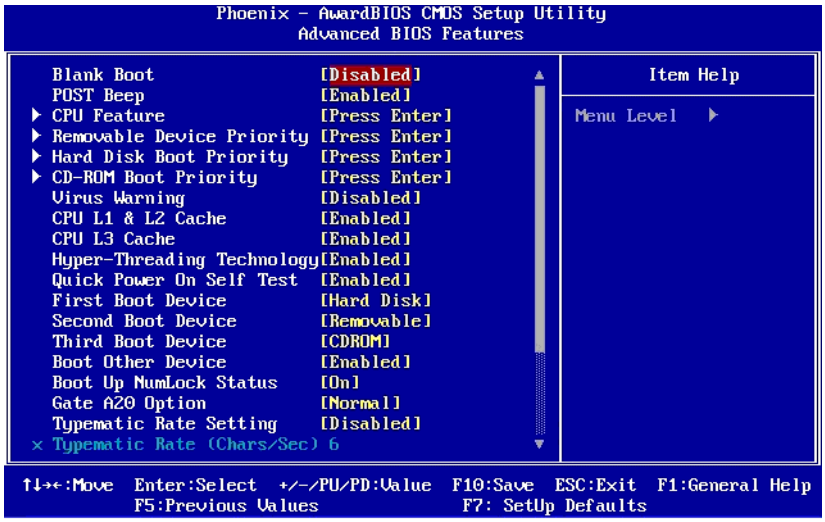
- **Extended Memory**

  Displays the amount of extended memory (above 1 MB in CPU's memory address map) installed in the system.

- **Total Memory**

  Displays the total system memory size.

3.2.3 Advanced BIOS Features



- **Blank Boot [Disabled]**
  This item allows the user to turn off display when in POST stage.
- **Post Beep [Enabled]**
  This item allows the user to enable/disable the video test pass beep function.
- **CPU Feature**
  This item allows the user to adjust CPU settings such as CPU ratio, VID and Thermal, and special features like XD flag.
- **Removable Device Priority**
  This item allows the user to select the boot sequence for system devices such as FDD, LS120, ZIP100, USB-HDD, USB-ZIP.

Note! *If no removable device connected, this item will hide!*

- **Hard Disk Boot Priority**
  This item allows the user to select the boot sequence for system devices such as HDD, SCSI, and RAID.
- **CD-ROM Boot Priority**
  This item allows the user to select the boot sequence for system devices such as CD-ROM, USB-CDROM.

Note! *If no CD-ROM device connected, this item will hide!*

- **Virus Warning [Disabled]**
  This item allows the user to enable/disable the Virus Warning function.
- **CPU L1 & L2 Cache [Enabled]**
  This item allows the user to enable/disable CPU L1 & L2 Cache.
- **CPU L3 Cache [Enabled]**
  This item allows the user to enable/disable CPU L3 cache.

Note! *If CPU does not have L3 Cache, this item will hide!*

- **Hyper-Threading Technology [Enabled]**
  This item allows the user to enable/disable Hyper-threading support for the Intel® Pentium® 4 processor with HT Technology.
- **Quick Power On Self Tes [Enabled]**
  This field speeds up the Power-On Self Test (POST) routine by skipping re-testing a second, third and fourth time. The default setting is enabled.
- **First / Second / Third Boot Drive**

Removable	Sets boot priority for removable devices.
Hard Disk	Sets boot priority for the hard disk.
CDROM	Sets boot priority for CDROM.
LAN	Sets boot priority for LAN.
Disabled	Disables this boot function.

- **Boot Other Device [Enabled]**
  This item allows the user to select other bootable device to boot if First / Second / Third boot device failed to boot.
- **Boot Up NumLock Status [On]**
  This item allows the user to activate the Number Lock key at system boot.
- **Gate A20 Option [Normal]**
  This item allows the user to switch on or off A20 control by port 92 or KBC.
- **Typematic Rate Setting**
  This item allows the user to set the two typematic control items.
  This field controls the speed of
  – Typematic Rate (Chars/Sec)
    This item controls the speed at which the system registers auto repeated keystrokes.
    The eight settings are: 6, 8, 10, 12, 15, 20, 24 and 30.
  – Typematic Delay (Msec)
    This item sets the key press delay time before auto repeat begins. The four delay rate options are: 250, 500, 750 and 1000.
- **Security Option [Setup]**

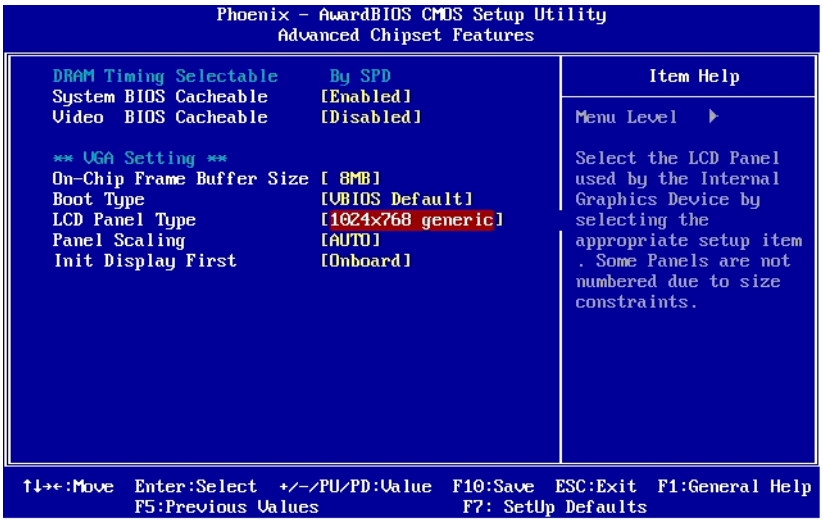
System	System requires correct password before booting, and also before permitting access to the Setup page.
Setup	System will boot, but requires correct password before permit ting access to Setup. (Default value)

- **APIC Mode [Enabled]**
  This item allows the user to enable/disable the “Advanced Programmable Interrupt Controller”. APIC is implemented in the motherboard and must be supported by the operating system; it extends the number of IRQs available.

Note! *APIC Mode will always be enabled and this item will be read-only for Intel Atom CPU!*

- **MPS Version Control for OS [1.4]**
  This item sets the operating system multiprocessor support version.
- **Full Screen LOGO Show [Disabled]**
  This item allows the user to enable/disable the Full Screen LOGO Show function.
- **Summary Screen Show [Disabled]**
  This item allows the user to enable/disable the System Devices Summary Screen Show function.

3.2.4 Advanced Chipset Features

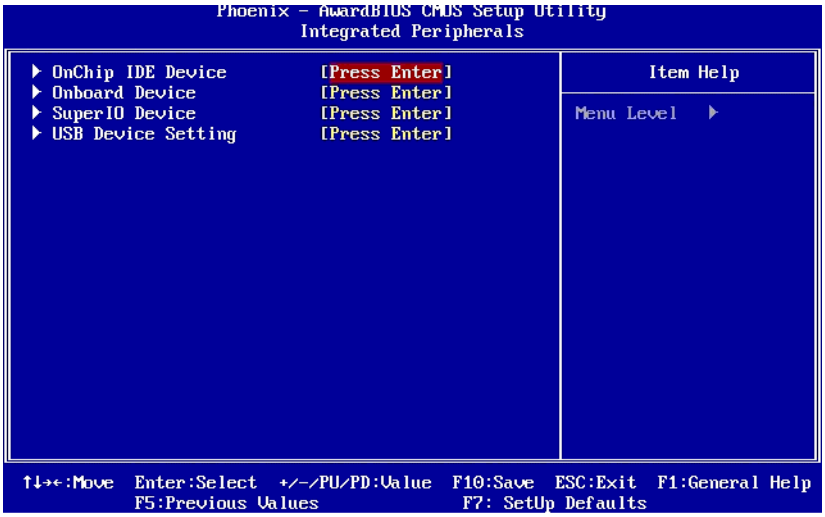


Note! *The "Advanced Chipset Features" screen controls the configuration of the board's chipset register settings and performance tuning - the options on this screen may vary depending on the chipset type. It is strongly recommended that only technical users make changes to the default settings.*

- **DRAM Timing Selectable [By SPD]**
  This item allows the user to set optimal timings for items 2 through 5. The system default setting of “By SPD” follows the SPD information on the ROM chip and ensures the system runs stably, with optimal performance.
- **System BIOS Cacheable[Enabled]**
  This item allows the system BIOS to be cached to allow faster execution and better performance.
- **Video BIOS Cacheable [Disabled]**
  This item allows the video BIOS to be cached to allow faster execution and better performance.
- **On-Chip Frame Buffer Size [8 MB]**
  This item allows the user to adjust the memory buffer for on-chip graphics.

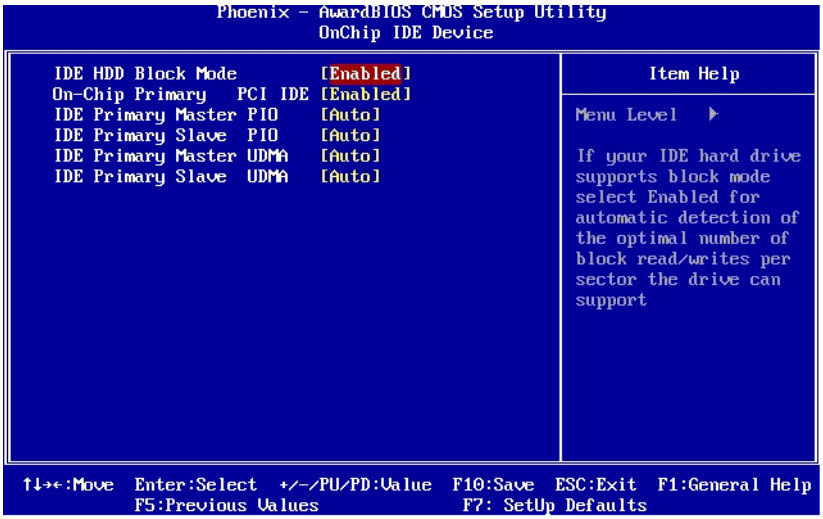
- **Boot Display [VBIOS Default]**
  This item allows the user to decide which display mode to use for the boot display.
- **LCD Panel Type [1024x768 generic]**
  This item allows the user to adjust panel resolution.
- **Panel Scaling [Auto]**
  This item allows the user to select LCD Panel Scaling mode.
- **Init Display First [Onboard]**
  This item is for setting start up video output from the PCI or onboard device.

3.2.5 Integrated Peripherals

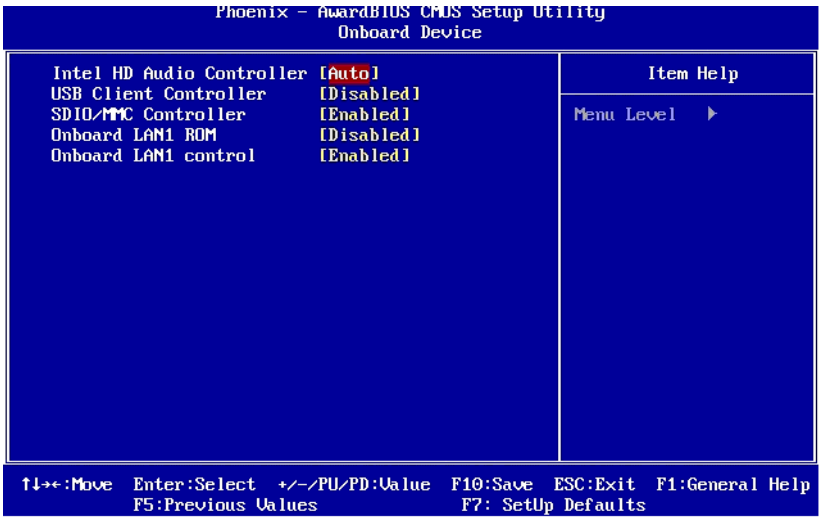


Note! *The "Integrated Peripherals" screen controls chipset configuration for IDE, ATA, SATA, USB, AC97, MC97 and Super IO and Sensor devices. The options on this screen vary depending on the chipset.*

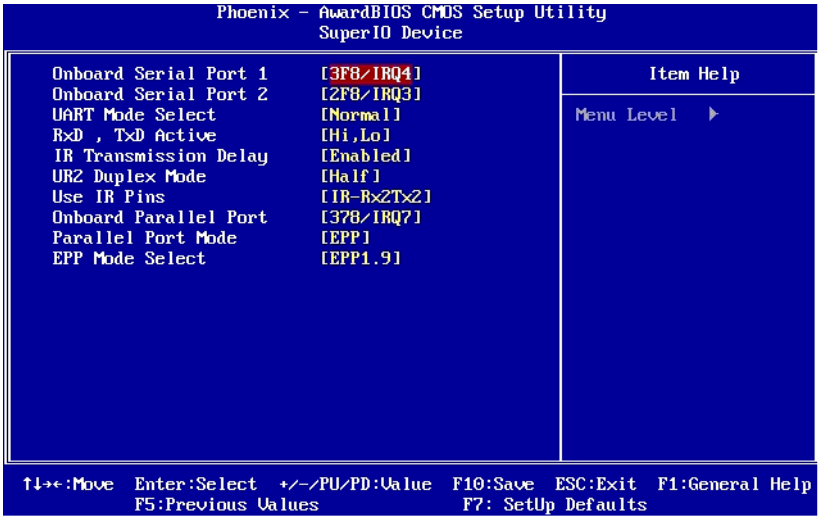
- **OnChip IDE Device**
  This item enables users to set the OnChip IDE device status, including IDE devices and setting PIO and DMA access modes. Some chipsets support newer SATA devices (Serial-ATA).
- **Onboard Device**
  This item enables users to set the Onboard Device status, including AC97, MC97 and LAN devices.
- **Super IO Device**
  This item enables users to set the Super IO device status, including Floppy, COM, LPT, IR and to control GPIO and Power fail status.
- **USB Device Setting**
  This item enables users to set the USB device status.



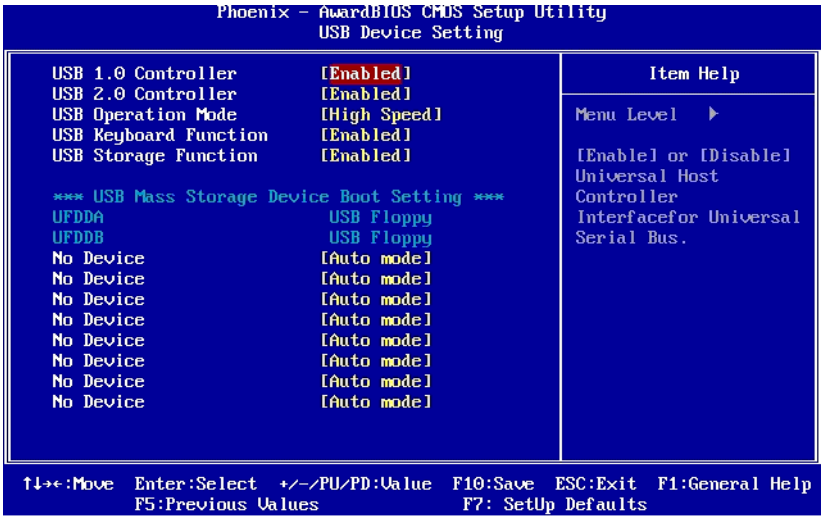
- **IDE HDD Block Mode [Enabled]**
  This item allows the user to enable block mode for HDD.
- **On-Chip Primary PCI IDE [Enabled]**
  This item allows the user to enable On-Chip IDE controller.
- **IDE HDD Primary Master/Slave PIO/UDMA [Auto]**
  This item allows the user to set PIO/UDMA mode for HDD.



- **Intel HD Audio Controlle [Auto]**
  This item allows the user to disable Intel HD Audio Controller or let Intel HD Audio Controller to detect HD Audio Codec.
- **USB Client Controller [Disabled]**
  This item allows the user to enable/disable USB Client Controller
- **SDIO/MMC Controller [Enabled]**
  This item allows the user to enable/disable SDIO/MMC Controller.
- **Onboard LAN1 ROM [Disabled]**
  This item allows the user to enable/disable Onboard LAN1 PXE ROM to execute.
- **Onboard LAN1 control [Enabled]**
  This item allows the user to enable/disable Onboard LAN1.



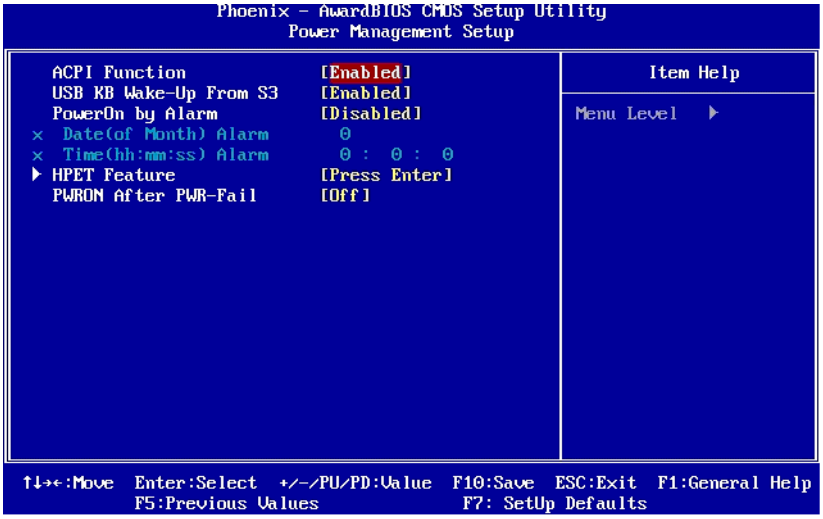
- **Onboard Serial port 1 [3F8/IRQ4]**
  This item allows the user to adjust serial port 1 address and IRQ.
- **Onboard Serial port 2 [2F8/IRQ3]**
  This item allows the user to adjust serial port 2 address and IRQ.
- **Onboard Parallel Port [378/IRQ7]**
  This item allows the user to adjust parallel port address and IRQ.
- **Parallel Port Mode [Standard]**
  This item allows the user to adjust parallel port mode.



- **USB 1.0 Controller [Enabled]**
  This item allows the user to enable/disable USB 1.0 Controller.
- **USB 2.0 Contoller [Enabled]**
  This item allows the user to enable/disable USB 2.0 Controller.
- **USB Operation Mode [High Speed]**
  This item allows the user to adjust USB devices operate at High/Full/Low speed.
- **USB Keyboard Function [Enabled]**
  This item allows the user to enable/disable legacy support of USB Keyboard.

- **USB Storage Function [Enabled]**
  This item allows the user to enable/disable legacy support of USB Mass Storage.
- **USB Mass Storage Device Boot Setting**
  This items list USB Mass Storage devices connected and allows user to set Mass Storage type.

3.2.6 Power Management Setup



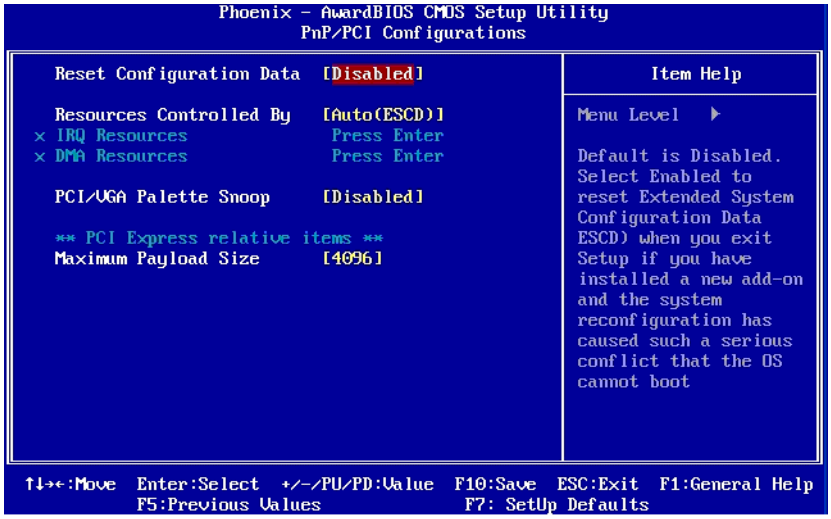
Note! *The "Power Management Setup" screen allows configuration of the system for effective energy savings while still operating in a manner consistent with intended computer use.*

- **ACPI Function [Enabled]**
  This item defines the ACPI (Advanced Configuration and Power Management) feature that makes hardware status information available to the operating system, and communicates to PC and system devices for improved power management.
- **USB KB Wake-Up From S3 [Enabled]**
  This item allows the user to enable and define how the USB KB/MS wakes the system up from S3 suspend mode.
- **Resume by Alarm [Disabled]**
  This item allows the user to enable and key in the date and time to power on the system

Disabled	Disable this function.
Enabled	Enable alarm function to power on system
Day (of month)	Alarm1-31
Time (HH:MM:SS)	Alarm(0-23) : (0-59) : 0-59)

- **PWRON After PWR-Fail [Off]**
  This item allows the user to select PWRON method after PWR-Fail.
- **HPET Feature**
  This item enables users to set HPET feature.

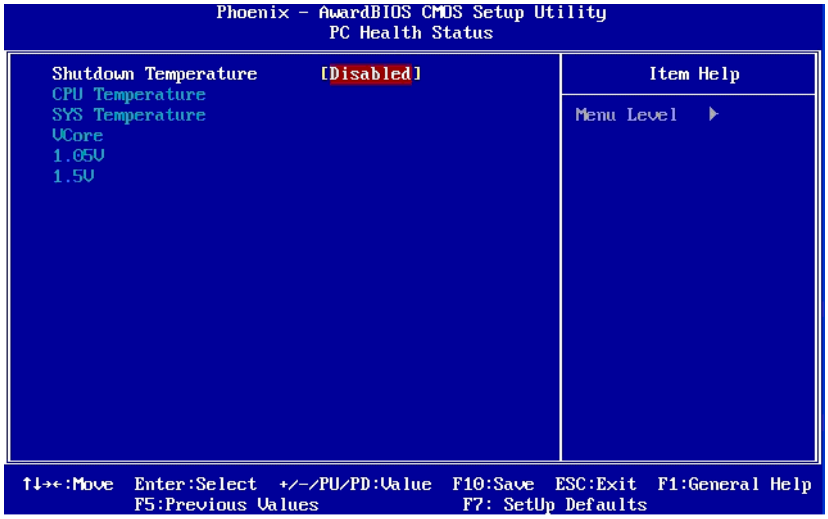
3.2.7 PnP/PCI Configurations



Note! *The "PnP/PCI Configurations" screen sets up the IRQ and DMA (both PnP and PCI bus assignments).*

- **Reset Configuration Data [Disabled]**
  This item allows the user to clear any PnP configuration data stored in the BIOS.
- **Resources Controlled By [Auto (ESCD)]**
  - IRQ Resources
    This item allows you respectively assign an interrupt type for IRQ-3, 4, 6, 7, 9 and 12.
  - DMA Resources
    This item allows you respectively assign an interrupt type for DMA-0, 1, 3, 5, 6 and 7.
- **PCI VGA Palette Snoop [Disabled]**
  The item is designed to solve problems caused by some non-standard VGA cards. A built-in VGA system does not need this function.
- **Maximum Payload Size [4096]**
  This item allows the user to adjust maximum TLP (Transaction Layer Packet) payload size.

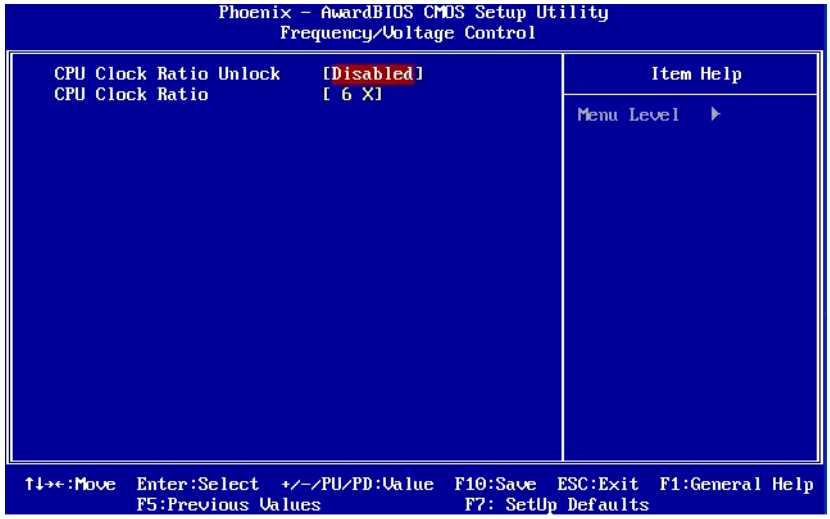
3.2.8 PC Health Status



Note! *The "PC Health Status" screen controls the thermal, fan, and voltage status of the board. The options on this page vary depending on the chipset.*

- **CPU Temperature Show [Only]**
  This item displays current CPU temperature.
- **SYS Temperature [Show Only]**
  This item displays current SYS temperature.
- **VCore/ 1.05 V/1.5 V [Show Only]**
  This item displays current CPU and system voltage.

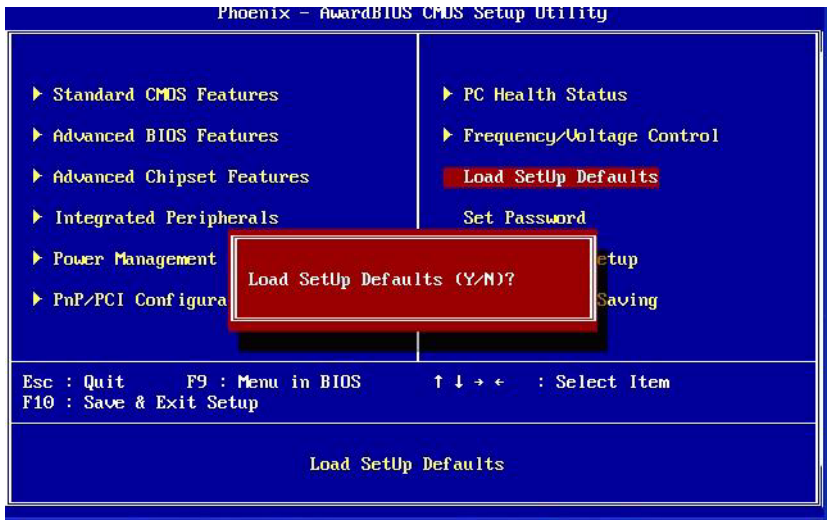
3.2.9 Frequency/Voltage Control



Note! *The "Frequency/Voltage Control" screen controls the CPU host frequency. The options on this page vary depending on the chipset; items show up according to installed CPU capacities.*

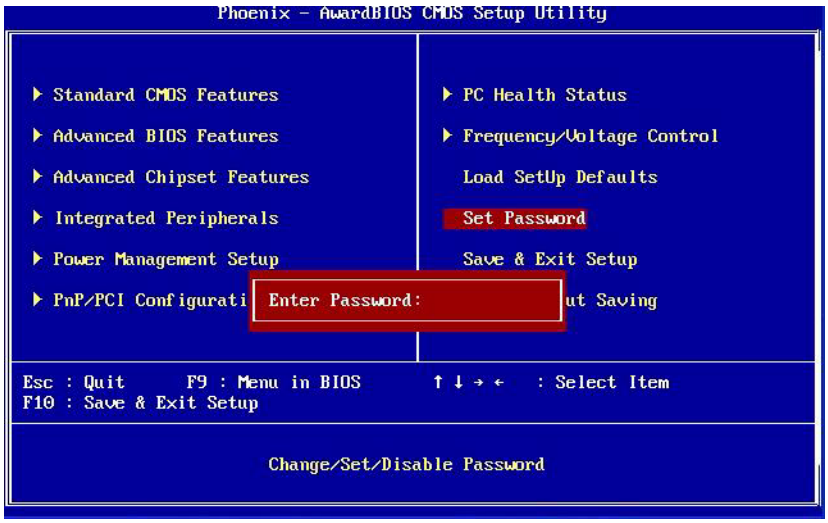
- **CPU Clock Ratio Unlock [Disabled]**
  This item allows the user to enable/disable CPU Clock Ratio setting.
- **CPU Clock Ratio [6X]**
  This item allows the user to set CPU Clock Ratio.

3.2.10 Load SetUp Defaults



Note! *"Load SetUp Defaults" loads the default system values directly from ROM. If the stored record created by the setup program should ever become corrupted (and therefore unusable), select Load Setup Defaults to have these default values load automatically for the next bootup.*

3.2.11 Set Password



Note!

To enable this feature, you should first go to the "Advanced BIOS Features" menu, choose the Security Option, and select either System or Setup, depending on which aspects you want password protected. System requires a password both to boot the system and to enter Setup. Setup requires a password only to enter Setup. A password may be at most 8 characters long.

To Establish Password

1. Choose the Set Password option from the CMOS Setup Utility Main Menu and press <Enter>.
2. When you see Enter Password, enter the desired password and press <Enter>.
3. At the Confirm Password prompt, retype the desired password, then press <Enter>.
4. Select Save to CMOS and exit, type <Y>, then <Enter>.

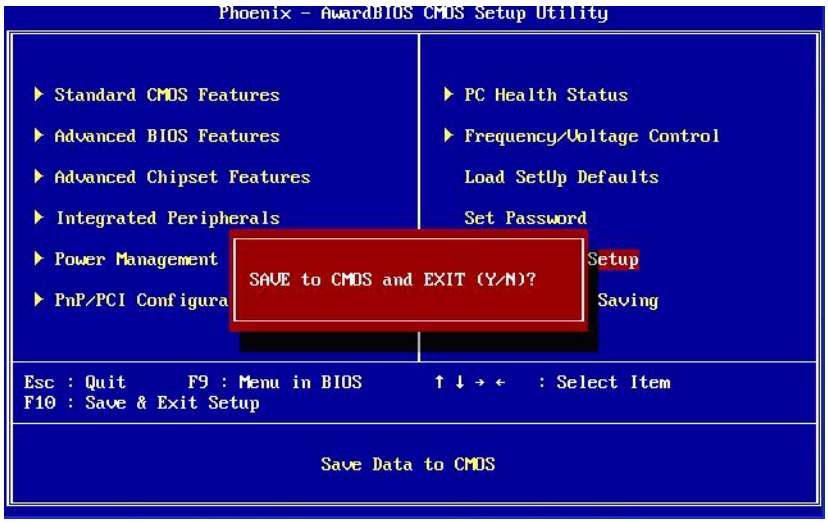
To Change Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see Enter Password, enter the existing password and press <Enter>.
3. You will see the Confirm Password prompt, type it in again, and press <Enter>.
4. Select Set Password again, and at the Enter Password prompt, enter the new password and press <Enter>.
5. At the Confirm Password prompt, retype the new password, and press <Enter>.
6. Select Save to CMOS and exit, type <Y>, then <Enter>.

To Disable a Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see the Enter Password prompt, enter the existing password and press <Enter>.
3. You will see Confirm Password, type it in again, and press <Enter>.
4. Select Set Password again, and at the Enter Password prompt, DO NOT enter anything - just press <Enter>.
5. At the Confirm Password prompt, again, DO NOT type in anything - just press <Enter>.
6. Select Save to CMOS and exit, type <Y>, then <Enter>.

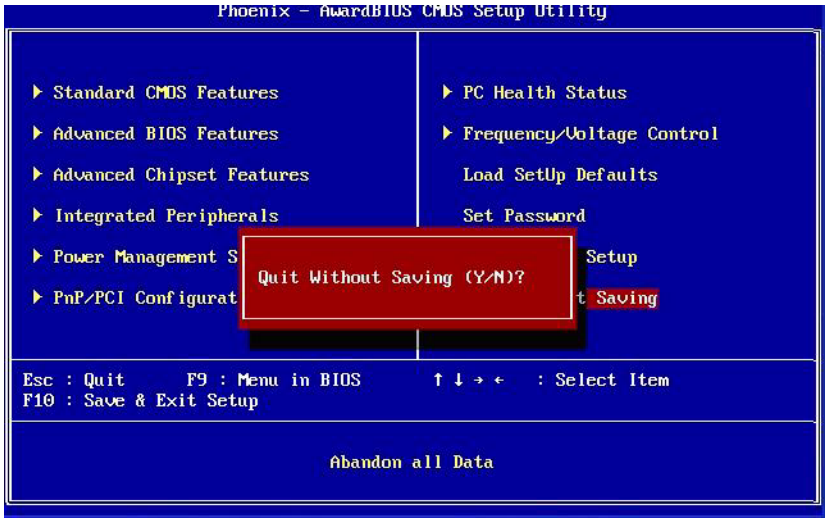
3.2.12 Save & Exit Setup



Note! *Typing <Y> will quit the BIOS Setup Utility and save the user setup values to CMOS.*

Typing <N> will return to BIOS Setup.

3.2.13 Quit Without Saving



Note! *Typing <Y> will quit the BIOS Setup Utility without saving any changes to CMOS.*

Typing <N> will return to the BIOS Setup Utility.

Chapter 4

S/W Introduction & Installation

4.1 S/W Introduction

The mission of Advantech Embedded Software Services is to "Enhance quality of life with Advantech platforms and Microsoft Windows® embedded technology." We enable Windows® Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (Hardware suppliers, System integrators, Embedded OS distributor) for projects. Our goal is to make Windows® Embedded Software solutions easily and widely available to the embedded computing community.

4.2 Driver Installation

The Intel® Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured.

4.2.1 Windows XP professional

To install the drivers please just insert the CD into CD-ROM, select the drivers that you want to install, then run .exe (set up) file under each chipset folder and follow Driver Setup instructions to complete the installation.

4.2.2 Other OS

To install the drivers for Other Windows OS or Linux, please browse the CD to run the setup file under each chipset folder on the CD-ROM.

Appendix A

Watchdog Timer

This appendix gives you the information about the watchdog timer programming on the SOM-6760 Computer on Module

Sections include:

- **Watchdog Timer Programming**

A.1 Programming the Watchdog Timer

1. SMBus Address: Pin 3 internal pull up 100K = 0X9C, External pull up 4.7K = 0X6E.
2. Enable WDT function: Configuration and function select register Index-03h.

Table A.1: Index-03h

1-0	PIN10_MODE	R/W	VSB3V	00:GPI010 01: LED10 IN this mode can use REG Ox06(bit1,0) to select LED frequency. 10,11 :WD_OUT

3. Watchdog Control: Watchdog Timer Control Register - Index 36h
   Power-on default [7:0] =0000_0000b

Table A.2: Watchdog Timer Index 36h

Bit	Name	P/W	PWR	Description
7	Reserved	RO	VSB3V	Reserved. Read will return 0.
6	STS WD TMOUT	R/W	VSB3V	Watchdog is timeout. When the watchdog is time-out, this bit will be set to one. If set to 1, write 1 will clear this bit. Write 0, no effect.
5	WD ENABLE	R/W	VSB3V	Enable watchdog timer.
4	WD PULSE	R/W	VSB3V	Watchdog output level or pulse. If set 0 (default), the pin of watchdog is level output, if write 1, the pin will output with a pulse.
3	WD UNIT	R/W	VSB3V	Watchdog unit select. Default 0 is select second. Write 1 to select minute.
2	WD HAC-TIVE	RW	VSB3V	Program WD2 output level. If set to 1 and watchdog asserted, the pin will be high. If set to 0 and watch-dog asserted, this pin will drive low (default).
1-0	WD_PS WIDTH	RW	VSB3V	Watchdog pulse width selection. If the pin output is selected to pulse mode. The pulse width can be choice. 00b- 1m second. 01b- 20m second. 10b -100m second. 11b- 4 second.

4. Watchdog reset timing control: Watchdog Timer Range Register - Index 37h
   Power-on default [7:0] =0000_0000b

Table A.3: Watchdog Timer Range - Index 37h

Bit	Name	P/W	PWR	Description
7-0	WD_TIME	RW	VSB3V	Watchdog timing range from 0 - 255. The unit is either second or minute programmed by the watchdog timer control register bits.

Appendix B

Programming GPIO

This Appendix gives the illustration of the General Purpose Input and Output pin setting.

Sections include:

- **System I/O ports**

B.1 GPIO Register

1. Configuration and function select Register - Index 03h

Table B.1: Index 03h

Bit	Name	P/W	PWR	Description
4-3	PIN12_MODE	RW	VSB3V	00: GPIO12 01: LED12 IN tills mode can use REG Ox06(bit5,4) to select LED frequency. 10: IRQ 11:WDTOUT11#:
2	PIN11_MODE	RW	VSB3V	0: GPI011 1: LED11 IN this mode can use REG Ox06(brt3,2) to select LED frequency.

2. Configuration and function select Register - Index 04h

Table B.2: Index 04h

Bit	Name	P/W	PWR	Description
1	PIN5_MODE	RW	VSB3V	0: GPI0171: LED17 IN this mode can use REG Ox07(bit7, 6) to select LED frequency.
0	PIN4_MODE	RW	VSB3V	0: GPIO161: LED16 IN this mode can use REG Ox07(bit5, 4) to select LED frequency.

3. Configuration and function select Register - Index 05h

Table B.3: Index 05h

Bit	Name	P/W	PWR	Description
2	PIN23_MODE	RW	VSB3V	0: GPIO241: LED24 IN this mode can use REG 0x09 (bit 1, 0) to select LED frequency.
1	PIN22_MODE	RW	VSB3V	0: GPI0251: LED25 IN this mode can use REG 0x09 (bit 3, 2) to select LED frequency.
0	PIN21_MODE	RW	VSB3V	0: GPIO261: LED26 IN this mode can use REG 0x09 (bit5, 4) to select LED frequency.

4. GPIOIx Output Control Register - Index 10h

Table B.4: Index 10h

Bit	Name	P/W	PWR	Description
7	GP17JX CTRL	RW	VSB3V	GPIO 17 output control. Set to 1 for output function. Set to 0 for input function (default).
6	GP16_O CTRL	RW	VSB3V	GPIO 16 output control. Set to 1 for output function. Set to 0 for input function (default).
2	GP12JD CTRL	RW	VSB3V	GPIO 12 output control. If this pin serves as IRQ/SMI#. this bit has no effect. Set to 1 for output function. Set to 0 for input function (default).
1	GP11_O CTRL	RW	VSB3V	GPIO 11 output control. Set to 1 for output function. Set to 0 for input function (default).mode can use REG 0x09 (bit5, 4) to select LED frequency.

5. GPIO2x Output Control Register - Index 20h

Table B.5: Index 20h

Bit	Name	P/W	PWR	Description
7	GP27_O CTRL	RW	VSB3V	GPIO 27 output control. Set to 1 for output function. Set to 0 for input function (default).
6	GP26_O CTRL	RW	VSB3V	GPIO 26 output control. Set to 1 for output function. Set to 0 for input function (default).
5	GP25_O CTRL	RW	VSB3V	GPIO 25 output control. Set to 1 for output function. Set to 0 for input function (default).
4	GP24_O CTRL	RW	VSB3V	GPIO 24 output control. Set to 1 for output function. Set to 0 for input function (default).
3	GP23_O CTRL	RW	VSB3V	GPIO 23 output control. Set to 1 for output function. Set to 0 for input function (default).
2	GP22_O CTRL	RW	VSB3V	GPIO 22 output control. Set to 1 for output function. Set to 0 for input function (default).
1	GP21_O CTRL	RW	VSB3V	GPIO 21 output control. Set to 1 for output function. Set to 0 for input function (default).
0	GP20_O CTRL	RW	VSB3V	GPIO 20 output control. Set to 1 for output function. Set to 0 for input function (default).

6. GPIOIx Output Data Register - Index 11h

Table B.6: Index 11h

Bit	Name	P/W	PWR	Description
7	GP17JD DATA	RW	VSB3V	GPIO 17 output data.
6	GP16_O DATA	RW	VSB3V	GPIO 16 output data.
5	GP15JD DATA	RW	VSB3V	GPIO 15 output data.
4	GP14JD DATA	RW	VSB3V	GPIO 14 output data.
3	GP13JD DATA	RW	VSB3V	GPIO 13 output data.
2	GP12_O DATA	RW	VSB3V	GPIO 12 output data. If this pin serves as IRQ/SMI*, this bit has no effect.
1	GP11_O DATA	RW	VSB3V	GPIO 11 output data.
0	GP10JD DATA	RW	VSB3V	GPIO 10 output data.

7. GPIOIx Input Status Register - Index 12h

Table B.7: Index 12h

Bit	Name	P/W	PWR	Description
7	GP17_P STS	RO	VSB3V	Read the GPIO17 data on the pin.
6	GP16_P STS	RO	VSB3V	Read the GPIO16 data on the pin.
5	GP15_P STS	RO	VSB3V	Read the GPIO15 data on the pin.
4	GP14_P STS	RO	VSB3V	Read the GPIO14 data on the pin..
3	GP13_P STS	RO	VSB3V	Read the GPIO13 data on the pin.
2	GP12_P STS	RO	VSB3V	Read the GPIO12 data on the pin.
1	GP11_P STS	RW	VSB3V	Read the GPIO11 data on the pin.
0	GP10_P STS	RW	VSB3V	Read the GPIO10 data on the pin.

Appendix C

System Assignments

This appendix gives you the information about the system resource allocation on the SOM-6760 CPU System on Module

Sections include:

- **System I/O ports**
- **DMA Channel Assignments**
- **Interrupt Assignments**
- **1st MB Memory Map**

C.1 System I/O Ports

Table C.1: System I/O ports	
Addr. range(Hex)	Device
0000 - 0CF7	PCI bus
0000 - 000F	Direct memory access controller
0010 - 001F	Motherboard resources
0020 - 0021	Programmable interrupt controller
0022 - 003F	Motherboard resources
0040 - 0043	System timer
0044 - 005F	Motherboard resources
0060 - 0060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0061 - 0061	System speaker
0062 - 0063	Motherboard resources
0064 - 0064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
0065 - 006F	Motherboard resources
0070 - 0073	System CMOS/real time clock
0074 - 007F	Motherboard resources
0080 - 0090	Direct memory access controller
0091 - 0093	Motherboard resources
0094 - 009F	Direct memory access controller
00A0 - 00A1	Programmable interrupt controller
00A2 - 00BF	Motherboard resources
00C0 - 00DF	Direct memory access controller
00E0 - 00EF	Motherboard resources
00F0 - 00FF	Numeric data processor
01F0 - 01F7	Primary IDE Channel
0274 - 0277	ISAPNP Read Data Port
0279 - 0279	ISAPNP Read Data Port
02F8 - 02FF	Communications Port (COM2)
0378 - 037F	Printer Port (LPT1)
03B0 - 03BB	Intel Corporation US15 Embedded Graphics
03C0 - 03DF	Intel Corporation US15 Embedded Graphics
03F6 - 03F6	Primary IDE Channel
03F8 - 03FF	Communications Port (COM1)
04D0 - 04D1	Motherboard resources
0500 - 051F	Intel® SCH Family SMBus Controller
0778 - 077B	Printer Port (LPT1)
0880 - 088F	Motherboard resources
0A78 - 0A7B	Motherboard resources
0B78 - 0B7B	Motherboard resources
0BBC - 0BBF	Motherboard resources
0D00 - FFFF	PCI bus
0E78 - 0E7B	Motherboard resources
0F78 - 0F7B	Motherboard resources
0FBC - 0FBF	Motherboard resources
D000 - DFFF	Intel® SCH Family PCI Express Root Port 3 - 8112

Table C.1: System I/O ports	
DF00 - FF3F	Intel® PRO/100 VE Network Connection
E000 - EFFF	Intel® SCH Family PCI Express Root Port 1 - 8110
FB00 - FB0F	Standard Dual Channel IDE Controller
FC00 - FC1F	Intel® SCH Family USB Universal Host Controller - 8116
FD00 - FD1F	Intel® SCH Family USB Universal Host Controller - 8115
FE00 - FE1F	Intel® SCH Family USB Universal Host Controller - 8114
FF00 - FF07	Intel Corporation US15 Embedded Graphics

C.2 DMA Channel Assignment

Note! *SOM-6760 does not support DMA function.*

C.3 Interrupt Assignments

Table C.2: Interrupt assignments

Interrupt#	Interrupt source
NMI	Parity error detected
IRQ 0	System timer / High precision event timer
IRQ 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ 2	Available
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Available
IRQ 6	Available
IRQ 7	Available
IRQ 8	System CMOS/real time clock
IRQ 9	Microsoft ACPI-Compliant System
IRQ 10	Available
IRQ 11	Available
IRQ 12	PS/2 Compatible Mouse
IRQ 13	Numeric data processor
IRQ 14	Primary IDE Channel
IRQ 15	Available
IRQ 16	Intel® SCH Family PCI Express Root Port 1 - 8110 Intel® SCH Family USB Universal Host Controller - 8114 Microsoft UAA Bus Driver for High Definition Audio SDA Standard Compliant SD Host Controller
IRQ 17	Intel® PRO/100 VE Network Connection Intel® SCH Family PCI Express Root Port 3 - 8112 Intel® SCH Family USB Universal Host Controller - 8115 SDA Standard Compliant SD Host Controller
IRQ 18	Intel® SCH Family USB Universal Host Controller - 8116 SDA Standard Compliant SD Host Controller
IRQ 19	Intel® SCH Family USB2 Enhanced Host Controller - 8117
USB and Ethernet IRQ is automatically set by the system	

C.4 1st MB Memory Map

Table C.3: 1st MB memory map

Addr. range (Hex)	Device
00000000 - 0009FFFF	System board
000A0000 - 000BFFFF	PCI bus
000A0000 - 000BFFFF	Intel Corporation US15 Embedded Graphics
000C0000 - 000DFFFF	PCI bus
000E0000 - 000EFFFF	PCI bus
000F0000 - 000FFFFF	System board
00100000 - 7F6DFFFF	System board
7F6E0000 - 7F7FFFFF	System board
7F800000 - FEBFFFFF	PCI bus
D8000000 - DFFFFFFF	Intel Corporation US15 Embedded Graphics
E0000000 - EFFFFFFF	Motherboard resources
FDA00000 - FDCFFFFF	Intel® SCH Family PCI Express Root Port 3 - 8112
FDCC0000 - FDCDFFFF	Intel® PRO/100 VE Network Connection
FDCFF000 - FDCFFFFF	Intel® PRO/100 VE Network Connection
FDD00000 - FDEFFFFF	Intel® SCH Family PCI Express Root Port 1 - 8110
FDF00000 - FDF7FFFF	Intel Corporation US15 Embedded Graphics
FDFC0000 - FDFDFFFF	Intel Corporation US15 Embedded Graphics
FDFF8000 - FDFFBFFF	Microsoft UAA Bus Driver for High Definition Audio
FDFFC000 - FDFFC0FF	SDA Standard Compliant SD Host Controller
FDFFD000 - FDFFD0FF	SDA Standard Compliant SD Host Controller
FDFFE000 - FDFFE0FF	SDA Standard Compliant SD Host Controller
FDFFF000 - FDFFF3FF	Intel® SCH Family USB2 Enhanced Host Controller - 8117
FEC00000 - FEC00FFF	System board
FED00000 - FED000FF	System board
FED00000 - FED003FF	High precision event timer
FED13000 - FED1DFFF	System board
FED20000 - FED8FFFF	System board
FEE00000 - FEE00FFF	System board
FFB00000 - FFB7FFFF	System board
FFB80000 - FFBFFFFF	Intel® 82802 Firmware Hub Device
FFF00000 - FFFFFFFF	System board

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